

## REMARKS

Reconsideration of the subject application is requested in view of the foregoing amendments and the following remarks.

Claims 1-12 are pending. In this paper, no claims are amended.

The amendment to the specification is to correct a readily discernible error. No new matter is submitted.

Applicant thanks the examiner for performing the search in association with substantive examination of the subject claims.

Claims 1-12 stand rejected for alleged obviousness from Meiri in view of Dobisz. This rejection is traversed.

Independent claim 1 is directed to a proximity-effect correction method in which, *inter alia*, in performing a local resizing of a pattern element on the reticle, a linewidth of the pattern element, as defined on the reticle, is changed by correspondingly changing an energy dose of an electron beam used to draw the pattern element on the reticle so as to change the linewidth from its initial design value.

Independent claim 2 is directed to a method for correcting errors in pattern elements, as imprinted on the substrate, caused by proximity effects, in which method, *inter alia*, a pattern element on the reticle is locally resized by changing a linewidth of the pattern element as defined on the reticle. This local resizing is performed by correspondingly changing a drawn linewidth of the pattern element and by correspondingly changing an energy dose of an electron beam used to draw the pattern element on the reticle so as to change the linewidth from its initial design value.

Independent claim 3 is directed to a method for producing a reticle for use in transferring a pattern, defined by the reticle, from the reticle to a substrate by charged-particle-beam microlithography. In one step of the method, in a design for a reticle pattern comprising pattern elements to be transferred to the substrate, local-resizing corrections to profiles of the pattern elements, to be defined on the reticle, are calculated so as to configure the pattern-element profiles for correcting proximity effects that otherwise would be manifest on the pattern elements

when projected onto the substrate. In another step corrected reticle-pattern data are obtained from the calculated corrections. In another step, pattern elements are formed on a reticle by drawing the pattern elements using an electron beam that is variably shaped as required to impart respective changes, according to the corrected reticle-pattern data, in a dose of the electron beam on the reticle. The changes in dose impart corresponding changes in linewidths of the pattern elements, as defined on the reticle, sufficiently to reduce proximity effects acting on the pattern elements when the pattern is transferred to the substrate.

Independent claim 5 is directed to a method for producing a reticle for use in transferring a pattern, defined by the reticle, from the reticle to a substrate using a charged particle beam. In one step of the method, in a design for a reticle pattern comprising pattern elements to be transferred to the substrate, corrections to profiles of the pattern elements, to be defined on the reticle, are calculated so as to configure the pattern-element profiles for correcting proximity effects that otherwise would be manifest on the pattern elements when projected onto the substrate. From the calculated corrections, corrected reticle-pattern data are obtained. According to the corrected reticle-pattern data, local resizing of the pattern elements is performed. The locally resized pattern elements are formed on a reticle by drawing the pattern elements using an electron beam as required to impart respective changes, according to the corrected reticle-pattern data, in a dose of the electron beam on the reticle, the changes in dose imparting corresponding changes in linewidths of the locally resized pattern elements, as defined on the reticle, sufficiently to reduce proximity effects acting on the pattern elements when the pattern is transferred to the substrate.

Independent claim 9 is directed to a reticle that defines a device pattern to be transferred onto a specific area of a sensitive substrate. The reticle comprises a reticle substrate and a pattern defined on the reticle substrate. The pattern includes a pattern element that is locally resized relative to a design specification for the pattern element. The locally resized pattern element has a linewidth that is corrected so as to reduce a proximity effect that otherwise would occur if the pattern element were exposed onto a sensitive substrate without the corrected linewidth. The linewidth is corrected on the reticle by varying a dose of an electron beam used to write the pattern element on the reticle substrate.

Independent claim 10 is directed to a reticle that comprises a reticle substrate and a pattern defined on the reticle substrate. The pattern includes a pattern element that is locally resized relative to a design specification for the pattern element. The locally resized pattern element has a linewidth that is corrected so as to reduce a proximity effect that otherwise would occur if the pattern element were exposed onto a sensitive substrate without the corrected linewidth. The linewidth is corrected on the reticle by varying a dose of an electron beam used to write the pattern element on the reticle substrate and by changing the linewidth as drawn on the reticle substrate.

As can be understood from the text of the independent claims set forth above, all the pending claims involve correcting a linewidth on the reticle by varying a dose of an electron beam used for writing the pattern element on the reticle substrate. This is not the same as varying the dose of exposure on the lithographic substrate (resist-coated wafer).

The Office action contends that, in methods disclosed in Meiri, a shape of a pattern element, as defined on the reticle, is changed "by correspondingly changing an energy dose of an electron beam used to draw the pattern element on the reticle, so as to change the shape from its initial design value." This contention is incorrect. For this statement, the Office action cites col. 6, line 60 to col. 7, line 3, which states:

In accordance with another aspect of the invention there is provided a proximity effect correction system for an E-beam lithography system wherein a design comprising at least one design shape is exposed on an E-beam sensitive resist, the system comprising means for contracting each designed shape by a predetermined bias to form a contracted design shape and logic for determining the E-beam dose required at any given point of the design such that each contracted design shape is enlarged, on development, by the value of the predetermined bias, and wherein the determination of the required E-beam dose is made in accordance with a predetermined relationship between an indicator and the required E-beam dose, the indicator being indicative of the degree of the proximity effect at any point on the design. . . .

The "dose" referred to in the cited passage is not the dose of a beam used for writing the pattern on the reticle. Rather, the "dose" is the dose of the beam used for transferring the pattern from the reticle to the resist on the substrate. See, e.g., col. 1, lines 44-45 and 65-66; col. 2, lines 11-13; col. 3, lines 41-43; col. 4, lines 25-28 and 44-48; col. 7, lines 48-52; col. 8, lines 1-4 and 10-12; col. 9, lines 14-16. In many other portions of Meiri, "dose" is discussed in the context of its

relationship with exposure of and backscatter from the lithographic substrate and never in the context of pattern writing on the reticle. In short, Meiri provides no teaching, suggestion, or hint whatsoever of varying a dose of an electron beam used to write the pattern element on the reticle substrate. (The reticle substrate is not the lithographic substrate.) Meiri also discusses changing the shapes of (i.e., biasing) certain pattern elements as defined on the reticle. However, biasing in this manner (which is well known in the art) is not the same as and does not lead to varying a dose of an electron beam used to write the pattern element on the reticle substrate.

Applicant also acknowledges and agrees with the admission in the Office action that "Meriri et al. [sic] do not disclose the changing of a linewidth of the pattern element, as defined on the reticle from its initial design value to reduce proximity effects."

Therefore, Meiri falls substantially short of teaching or suggesting any of the pending claims.

Dobisz does not fulfill the deficiencies of Meiri. The Office action contends that "Dobisz et al. disclose the changing of a linewidth of the pattern element, as defined on the reticle from its initial design value to reduce proximity effects (column 2, line 30-32) . . . ." This contention is incorrect. The text in Dobisz cited by the examiner states, "It is another object of this invention to reduce linewidths and to reduce or eliminate proximity effects in electronic circuits." Applicant traverses the examiner's implication that this passage in Dobisz fulfills in any way the deficiencies of Meiri. First, it is clear that this cited text makes no mention of changing the linewidth of pattern elements, as defined on the reticle, from initial design values to reduce proximity effects. Second, the linewidths to be reduced in this passage merely are linewidths as formed on the resist-coated substrate (see col. 1, lines 6-12), not on the reticle. Third, this passage merely states a general object of Dobisz's invention without providing any indication as to how the object is fulfilled. Fourth, this passage provides no hint whatsoever of varying the dose of an electron beam used to write the pattern element on the reticle substrate, as required by the instant claims.

Therefore, because Dobisz falls far short of fulfilling the deficiencies of Meiri, none of the pending claims is obvious from any conceivable combination of Meiri and Dobisz.

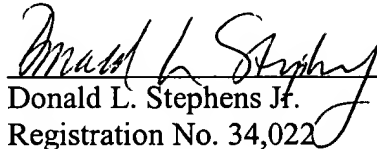
Withdrawal of the rejection is proper and hereby requested.

Applicant has a right to an interview at this stage of prosecution. If any issues remain unresolved after consideration of the contents of this paper, the examiner is requested to contact

the undersigned to schedule a telephonic interview. Any inaction by the examiner to make such contact, followed by issuance of a final action, will be regarded as an acquiescence by the examiner to grant an interview as a matter of right after the final action.

Respectfully submitted,

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